ANTIDEGRADATION REVIEW

NPDES Permit # ID-002659-0
Hayden Area Regional Sewer Board Wastewater Treatment Facility

Idaho Department of Environmental Quality
February 10, 2012

In March 2011, Idaho incorporated new provisions addressing antidegradation implementation in the Idaho Code. The new antidegradation provisions are in Idaho Code §39-3603. At the same time, Idaho adopted antidegradation implementation procedures in the Idaho Water Quality Standards. DEQ submitted the antidegradation implementation procedures to EPA for approval on April 15, 2011. On August 18, 2011 EPA approved of the implementation procedures.

The Idaho Water Quality Standards (WQS) contain an antidegradation policy providing three levels of protection to water bodies in Idaho (IDAPA 58.01.02.051). The first level of protection applies to all water bodies subject to Clean Water Act jurisdiction and assures that existing uses of a water body and the level of water quality necessary to protect the existing uses will be maintained and protected (Tier 1 protection)(IDAPA 58.01.02.051.01; 58.01.02.052.01). Additionally, a Tier 1 review is performed for all new or reissued permits or licenses (IDAPA 58.01.02.052.05). The second level of protection applies to those water bodies that are considered high quality and assures that no lowering of water quality will be allowed unless it is deemed necessary to accommodate important economic or social development (Tier 2 protection) (IDAPA58.01.02.051.02; 58.01.02.052.06). The third level of protection applies to water bodies that have been designated outstanding resource waters and requires activities to not cause a lowering of water quality (Tier 3 protection) (IDAPA 58.01.02.051.03; 58.01.02.052.07).

DEQ is employing a waterbody-by-waterbody approach to implementing Idaho's antidegradation policy. This approach to antidegradation implementation means that any water body fully supporting its beneficial uses will be considered high quality. Any waterbody not fully supporting its beneficial uses will be provided Tier 1 protection for that use, unless specific circumstances warranting Tier 2 protection are met. The most recent federally-approved Integrated Report and supporting data are used to determine support status and the tier of protection (Idaho Code §39-3603(2)(b)).

Pollutants of Concern

The Hayden Area Regional Sewer Board Wastewater Treatment Facility (HARSB) discharges the following pollutants of concern: carbonaceous biochemical oxygen demand ($CBOD_5$), total suspended solids (TSS), pH, total phosphorus, *E. coli*, lead, zinc, cadmium, chlorine, and ammonia. Effluent limitations have been developed for all pollutants of concern. HARSB is proposing to increase their discharge from a design flow of 1.5 mgd to 2.4 mgd and transition from an intermittent to a continuous discharge (Fact Sheet for HARSB current permit 1999-2004 and 2011 Fact Sheet for draft permit).

Receiving Water Body Level of Protection

HARSB discharges to the Spokane River assessment unit ID17010305PN004_04 (Coeur d'Alene Lake to Post Falls Dam). This assessment unit has the following designated beneficial uses (IDAPA 58.01.02.110.12): cold water aquatic life, salmonid spawning, primary contact recreation, domestic, agricultural and industrial water supply, wildlife habitat, and aesthetics. There is no available information indicating the presence of any existing beneficial uses aside from those already designated.

The cold water aquatic life use in this Spokane River assessment unit is not fully supported due to excess cadmium, lead, zinc and total phosphorus (DEQ, 2010 Integrated Report). The primary contact recreation beneficial use has not been assessed; however *E. coli* data collected in 2007 indicate that recreation uses are fully supported. Based upon this information DEQ will provide Tier 2 protection, in addition to Tier 1, for the recreation beneficial use (Idaho Code §39-3603(2)(b).

Protection and Maintenance of Existing Uses (Tier 1 Protection)

As noted above, a Tier 1 review is performed for all new or reissued permits or licenses, applies to all waters subject to the jurisdiction of the Clean Water Act, and requires a showing that existing uses and the level of water quality necessary to protect existing uses shall be maintained and protected. In order to protect and maintain designated and existing beneficial uses, a permitted discharge must comply with narrative and numeric criteria of the Idaho Water Quality Standards (WQS), as well as other provisions of the WQS such as Section 055, which addresses water quality limited waters. The numeric and narrative criteria in the WQS are set at levels that ensure protection of designated beneficial uses. The effluent limitations and associated requirements contained in the HARSB permit are set at levels that ensure compliance with the narrative and numeric criteria in the WQS.

Because there is no available information indicating the presence of any existing uses other than the designated uses discussed above, the permit ensures that the level of water quality necessary to protect both designated and existing uses is maintained and protected, in compliance with IDAPA 58.01.02.051.01, IDAPA 58.01.02.052.05 and 40 CFR 131.12(a)(1).

Water bodies not supporting existing or designated beneficial uses must be identified as water quality limited and a total maximum daily load (TMDL) must be prepared for those pollutants causing impairment. A central purpose of TMDLS is to establish wasteload allocations for point source discharges, which are set at levels designed to help restore the waterbody to a condition that supports existing and designated beneficial uses. Discharge permits must contain limitations that are consistent with wasteload allocations in the approved TMDL.

In the absence of a TMDL and depending on the priority status for development of a TMDL, the WQS (IDAPA 58.01.02.055.04 and .05) stipulate that either there be no further impairment of the designated or existing beneficial uses or that the total load of the impairing pollutant remains constant or decreases. Discharge permits must comply with these provisions of Idaho WQS.

This assessment unit of the Spokane River is not supporting its cold water aquatic life beneficial use. This impairment is a result of total phosphorus, cadmium, lead and zinc concentrations

above the criteria set to protect the cold water aquatic life uses. The 2010 Integrated Report lists the Spokane River (part of the Upper Spokane HUC) as a high priority water body for TMDL development. Based on this priority status, DEQ must ensure, pursuant to IDAPA 58.01.02.055.04 that discharges of pollutants of concern remain constant or decrease within the watershed. Effluent limits in the draft permit for lead and zinc remain at the same level as the current permit. The draft 401 certification adds effluent limits for cadmium and a seasonal limit (November through January) for phosphorus based upon HARSB 2006-2011 effluent monitoring which ensures that the load will not increase beyond current conditions prior to the development of a TMDL (Table 1).

In summary, the effluent limitations and associated requirements contained in the HARSB's permit are set at levels that ensure compliance with the narrative and numeric criteria in the WQS. Therefore, DEQ has determined the permit will protect and maintain existing and designated beneficial uses in the Spokane River.

Table 1. Comparison of proposed permit limits with current permit limits for the pollutants of concern.

		Proposed Permit			**Current Permit**			
Parameter	Units	Average Monthly Limit	Average Weekly Limit	Maximum Daily	Average Monthly Limit	Average Weekly Limit	Maximum Daily	Change[1]
Pollutants with limits in both the current and proposed permit								
C BOD_5 November-January	***mg/L***	***25***	***40***	***-***	***30***	***45***	***-***	***I[2]***
	lb/day	***500***	***801***	***-***	***375***	***563***	***-***	
	% removal	***85%***	***-***	***-***	***85%***	***-***	***-***	
C BOD_5 February-October contin. discharge	***mg/L***	***25***	***40***	***-***	***30***	***45***	***-***	***d***
	lb/day	***101***	***162***	***-***	***375***	***563***	***-***	
	% removal	***85%***	***-***	***-***	***85%***	***-***	***-***	
C BOD_5 February-October not contin. discharge	***mg/L***	***25***	***40***	***-***	***30***	***45***	***-***	***d***
	lb/day	***77.4 seasonal average***		***-***	***375***	***563***	***-***	
	% removal	***85%***	***-***	***-***	***85%***	***-***	***-***	
TSS	***mg/L***	***30***	***45***	***-***	***30***	***45***	***-***	***I[2]***
	lb/day	***600***	***901***	***-***	***375***	***563***	***-***	
	% removal	***85%***	***-***	***-***	***85%***	***-***	***-***	
pH October-May	***s.u.***	***6.2 – 9.0 all times***			***6.0 – 9.0 all times***			***d***
pH June-September ≤2,000CFS	***s.u.***	***6.4 – 9.0 all times***			***6.0 – 9.0 all times***			***d***
pH June-September >2,000CFS	***s.u.***	***6.0-9.0 all times***						
E. coli	***#/100 mL***	***126***	***-***	***406***	***-***	***-***	***-***	***nc***
Fecal coliform[3] May-Sept	***#/100 mL***	***-***	***-***	***-***	***50***	***200***	***500***	***nc***
Fecal coliform[3] October-April	***#/100 mL***	***-***	***-***	***-***	***-***	***200***	***800***	***nc***
Total Residual Chlorine October-May	***µg/L***	***500***	***750***	***-***	***500***	***-***	***-***	***nc***
	lb/day	***10***	***15***	***-***	***-***	***-***	***-***	
Total Residual Chlorine June-September >2,000 CFS	***µg/L***	***500***	***750***	***-***	***500***	***-***	***-***	***nc***
	lb/day	***10***	***15***	***-***	***-***	***-***	***-***	
Total Residual Chlorine June-September ≤2,000 CFS	***µg/L***	***119***	***-***	***629***	***500***	***-***	***-***	***nc***
	lb/day	***2.38***	***-***	***12.6***				
Zinc	***µg/L***	***88.2***		***112***	***88.2***	***-***	***112***	***d***
	lb/day	***1.10***		***1.40***	***1.10***	***-***	***1.40***	

		Proposed Permit			Current Permit			
Parameter	*Units*	*Average Monthly Limit*	*Average Weekly Limit*	*Maximum Daily Limit*	*Average Monthly Limit*	*Average Weekly Limit*	*Maxi-mum Daily Limit*	*Change*[1]
Pollutants with limits in both the current and proposed permit (continued)								
Total Ammonia March-June	***mg/L***	***78.7***	***-***		***78.7***	***-***	***250***	***d***
	lb/day	***649***	***-***	***1547***	***985***	***-***	***3128***	
Total Ammonia July-September	***mg/L***	***6.59***	***-***	***15.7***	***78.7***	***-***	***250***	***d***
	lb/day	***330***	***-***	***786***	***985***	***-***	***3128***	
Total Ammonia October	***mg/L***	***Report***	***-***	***Report***	***78.7***	***-***	***250***	***d***
	lb/day	***525***	***-***	***1252***	***985***	***-***	***3128***	
Total Ammonia March-October	***mg/L***	***-***	***-***	***-***	***78.7***		***250***	***d***
	lb/day	***272 seasonal average limit***		***-***	***985***	***-***	***3128***	
Total Ammonia November-February	***mg/L***	***Report***	***-***	***Report***	***78.7***	***-***	***250***	***nc***
	lb/day	***-***	***-***	***-***	***985***	***-***	***3128***	
Lead	***µg/L***	***2.00***	***-***	***3.76***	***2.66***	***-***	***3.76***	***nc***
	lb/day	***0.033***	***-***	***0.047***	***0.033***	***-***	***0.047***	***nc***
Pollutants with limits only in the proposed permit								
Total Phosphorus Feb-October	***lb/day***	***1.33 seasonal average***		***-***	***-***	***-***	***-***	***d***
Total Phosphorus November-January[4]	***µg/L***	***?***	***-***	***-***	***-***	***-***	***-***	***nc***
	lb/day	***?***	***-***	***-***	***-***	***-***	***-***	***nc***
Cadmium[4]	***µg/L***	***?***	***-***	***-***	***-***	***-***	***-***	***nc***
	lb/day	***?***	***-***	***-***	***-***	***-***	***-***	***nc***

		Proposed Permit			Current Permit			
Parameter	*Units*	*Average Monthly Limit*	*Average Weekly Limit*	*Maximum Daily Limit*	*Average Monthly Limit*	*Average Weekly Limit*	*Maxi-mum Daily Limit*	*Change*[1]
Pollutants with no limits in either the current and proposed permit								
Temperature	***ºC***	***Report***	**-**	***Report***	**-**	**-**	***Report***	***nc***
PCB	***pg/L***	***Report***		***Report***	**-**	**-**	**-**	***nc***
Mercury	***ng/L***	**-**	**-**	**-**	**-**	**-**	**-**	***nc***
TCDD	***pg/L***	***Report***	**-**	***Report***	**-**	**-**	**-**	***nc***
Silver	***µg/L***	***Report***	**-**	***Report***	**-**	**-**	**-**	***nc***
	lb/day	**-**	**-**	**-**	**-**	**-**	**-**	
Copper	***µg/L***	***Report***	**-**	***Report***	**-**	**-**	**-**	***nc***
	lb/day	**-**	**-**	**-**	**-**	**-**	**-**	
Alkalinity	***mg/L as $CaCO_3$***	***Report***	**-**	***Report***	**-**	**-**	**-**	***nc***
Hardness	***mg/L as $CaCO_3$***	***Report***	**-**	***Report***	**-**	**-**	**-**	***nc***
Oil and Grease	***mg/L***	***Report***	**-**	***Report***	**-**	**-**	**-**	***nc***
TDS	***mg/L***	***Report***	**-**	***Report***	**-**	**-**	**-**	***nc***
Ortho-phosphate	***µg/L***	***Report***	**-**	***Report***	**-**	**-**	**-**	***nc***
Kjeldahl Nitrogen	***mg/L***	***Report***	**-**	***Report***	**-**	**-**	**-**	***nc***
Nitrate-Nitrite	***mg/L***	***Report***	**-**	***Report***	**-**	**-**	**-**	***nc***
Dissolved Oxygen	***mg/L***	***Report minimum and average***			**-**	**-**	**-**	***nc***

[1] ***nc*** = no change in effluent limit from current permit; ***I*** = increase of pollutants from current permit; ***d*** = decrease of pollutants from current permit;

[2]The increased loads of CBOD5 (November-February) and TSS in the draft permit do not exceed narrative or numeric criteria in the Idaho WQS and meets the requirements for Tier 1 protection.

[3] DEQ requested EPA replace the fecal coliform limits with *E. coli* effluent limits. See discussion under High Quality Waters section (below).

[4]Effluent limits are based on ???? of phosphorus discharged during the November-January timeframe from 2008-2011 obtained from HARSB effluent monitoring data. Effluent limits for phosphorus and cadmium are required by the draft 401 certification to meet requirements of IDAPA 58.01.02.055.04.

High Quality Water (Tier 2 Protection)

The Spokane River is not assessed for recreational use. Monitoring data for *E. coli* collected in 2007 within the subject assessment unit, indicates that the Spokane River is high quality for the primary contact recreation beneficial use. As such, the water quality relevant to recreational uses of the Spokane River must be maintained and protected, unless a lowering of water quality is deemed necessary to accommodate important social or economic development.

To determine whether degradation will occur, DEQ must evaluate how the permit issuance will affect water quality for each pollutant that is relevant to recreational uses of the Spokane River (IDAPA 58.01.02.052.04). These include the following pollutants: *E. coli* bacteria, phosphorus and mercury. Effluent limits are set in the proposed permit for these pollutants except mercury.

For a reissued permit or license, the effect on water quality is determined by looking at the difference in water quality that would result from the activity or discharge as authorized in the current permit and the water quality that would result from the activity or discharge as proposed in the reissued permit or license (IDAPA 58.01.02.052.04.a). For a new permit or license, the effect on water quality is determined by reviewing the difference between the existing receiving water quality and the water quality that would result from the activity or discharge as proposed in the new permit or license (IDAPA 58.01.02.052.04.a).

<u>Pollutants with Limits in the Current and Proposed Permit: E. coli</u>

For pollutants that are currently limited (have effluent limits) and will have limits under the reissued permit, the current discharge quality is based on the limits in the current permit or license (IDAPA 58.01.02.04.a.i) and the future discharge quality is based on the proposed permit limits (IDAPA 58.01.02.052.04.a.ii). For the HARSB permit, this means determining the permit's effect on water quality based upon the limits for bacteria in the current and proposed permits. Table 1 provides a summary of the existing permit limits and the proposed reissued permit limits.

The existing permit for HARSB contains effluent limits for fecal coliform bacteria and monitoring requirements for *E. coli* bacteria. In 1986, EPA updated its criteria to protect recreational use of water by recommending an *E. coli* criterion as a better indicator of bacteria levels that may cause gastrointestinal distress in swimmers. In 2000, DEQ changed its bacteria criterion from fecal coliform limits to *E. coli*. The *E. coli* monitoring requirements were in the existing permit to reflect the transition to the bacteria criterion that DEQ adopted to protect the contact recreation beneficial use (IDAPA 58.01.02.251.01). The fecal coliform limits were in the current permit because at the time the permit was issued, IDAPA 58.01.02.420.05 established a disinfection requirement for sewage wastewater treatment plan effluent. This requirement specified that fecal coliform concentrations not exceed a geometric mean of 200/100 mL based on a minimum of five samples in one week. This section of the Idaho WQS was revised in 2002 to reflect the earlier change under IDAPA 58.01.02.251.01of the bacteria criterion. The *E. coli* "end-of-pipe" limits are as or more protective of water quality than the old fecal coliform limits. Thus removal of the fecal coliform limits complies with both the Tier 1 and Tier 2 components of Idaho's antidegradation policy.

The proposed increased design flow (1.5 mgd to 2.4 mgd) will theoretically increase the concentration of *E. coli* bacteria at the edge of a mixing zone. A Tier 2 analysis, however, is only required if the degradation is determined to be significant (Idaho Code §39-3603(2)(c)). Degradation is determined to be significant when the discharge of the pollutant will cumulatively decrease the remaining assimilative capacity by more than ten percent (Idaho Code §39-3603(2)(c)(i)). HARSB new design flow will increase E. coli by 0.27% over the currently permitted amount. Since this value is less than 10% of the remaining assimilative capacity, HARSB new design flow is an insignificant increase (see Appendix A for the analysis).

New Permit Limits for Pollutants Currently Discharged: Phosphorus

When new limits are proposed in a reissued permit for pollutants in the existing discharge, the effect on water quality is based upon the current discharge quality and the proposed discharge quality resulting from the new limits. Current discharge quality for pollutants that are not currently limited is based upon available discharge quality data (IDAPA 58.01.02.052.04.a.i). Future discharge quality is based upon proposed permit limits (IDAPA 58.01.02.052.04.a.ii).

The proposed permit for HARSB includes new limits for phosphorus during the February-October timeframe (Table 1). These limits require a reduction in phosphorus and were included in the permit to be consistent with the wasteload allocations in the approved, Spokane River and Lake Spokane Dissolved Oxygen Total Maximum Daily Load, Washington Department of Ecology, February 2010. Additionally, the 401 certification includes an effluent limit for phosphorus during the November-January timeframe to maintain water quality per the requirements of IDAPA 58.01.02.055.04 of the Idaho WQS.

HARSB draft permit will allow a new phosphorus discharge to the Spokane River when flows are less than 2,000 cfs during the June-September timeframe. The previous permit did not allow a discharge under these conditions. Degradation from this increased amount of phosphorus will not occur because of the significant reductions of phosphorus required in the draft permit for the Coeur d'Alene Wastewater Treatment Facility located upstream of the HARSB outfall. However, before the final effluent limits become effective, the HARSB new discharge of phosphorus during the summer (<2,000 cfs river flow) was determined to result in an insignificant (1.3%) reduction in assimilative capacity (see Appendix B for the analysis). If HARSB increases their design flow prior to their facility's ability to remove phosphorus, they will need to implement interim measures in the watershed so the load remains constant or decreases. The use of pollutant offsets to fulfill requirements of IDAPA 58.01.02.055.04 has been authorized in the draft certification.

Pollutants with No Limits: Mercury

Mercury is a pollutant of concern relevant to Tier 2 protection of recreational uses that is currently not limited and for which the draft permit also contains no limit (Table 1). For such pollutants, a change in water quality is determined by reviewing whether there will likely be changes in production, treatment or operation that will increase the discharge of these pollutants (IDAPA 58.01.02.052.04.a.ii). With respect to mercury, there is no reason to believe this pollutant will be discharged in quantities greater than those discharged under the current permit. This conclusion is based upon the fact that there have been no changes in the influent quality or

treatment processes that would likely result in an increased discharge of this pollutant. Additionally, whole effluent toxicity testing using three different organisms will be required twice per year to detect toxics in toxic amounts. A toxicity reduction evaluation is required in the event of an excursion above a trigger value. Mercury monitoring will be required three times over a five year period as part of the expanded effluent testing requirements in Part D of NPDES application Form 2A (EPA Form 3510-2A, revised 1-99). Mercury levels in HARSB effluent were tested in 2004 and reported in Part D of Form 2A as "no detection". Because of these provisions, the proposed permit does not allow for any increased water quality impact from this pollutant and DEQ concludes that the proposed permit should not cause a lowering of water quality for mercury. As such, the proposed permit should maintain the existing high water quality in the Spokane River.

Appendix A
HARSB and Post Falls *E. coli* Significance Tests

Background

The Spokane River is considered a high quality water for recreational uses. To prevent the lowering of water quality with respect to *E. coli*, DEQ must ensure that the Hayden Area Regional Sewer Board (HARSB) draft permit must not cumulatively decrease the remaining assimilative capacity of the river by more than ten percent to be considered insignificant degradation (Idaho Code §39-3603(2)(c)(i)).

Assimilative capacity is determined by comparing the background (ambient) concentration of a pollutant with the Water Quality Standard. The difference between these two numbers is the remaining assimilative capacity. A ten percent or less decrease of the remaining assimilative capacity is considered to be insignificant degradation. Because no data exists for E. coli in the Spokane River above the three dischargers, data from USGS monitoring station #12419000 located below the Post Falls WWTP (6 samples in 2007) will be used as the upstream background concentration until new data is made available.

Analysis

The following information was used in calculating assimilative capacity in order to determine significance:

- Background concentration upstream of CdA discharge: 11.7 *E. coli* colony forming units/100ml (cfu) (average value of USGS data that was collected monthly from April to September in 2007);
- The increased discharge from current design flow to proposed design flow for all dischargers along the Spokane River: CdA 6.0 mgd (no increase), HARSB 1.5 to 2.4 mgd increase (0.9mgd increase); Post Falls 3.48 to 5 mgd (1.52mgd increase);
- The WQS effluent limit of 126 colony forming units/100ml (cfu) for *E. coli*;
- A river flow of 500cfs as measured at the USGS Station #12419000 located below the Post Falls hydroelectric facility. This minimum flow is required in the 2009 Avista Corporation relicensing agreement for the operation of the Post Falls hydroelectric facility.
- The full river width for mixing.

CdA

current design	new design
6.0 mgd	6.0 mgd=no change (9.3 cfs)

spreadsheet inputs:
500cfs upstream flow
11.7 cfu/L upstream E. coli
126cfu maximum E. coli effluent concentration per current NPDES permit
9.3 cfs effluent flow = 13.79 in-river concentration of *E. coli* downstream of CdA outfall

HARSB

current design	new design
1.5 mgd (2.32 cfs)	2.4 mgd (3.7 cfs)

HARSB Current
spreadsheet inputs:
509.3cfs upstream flow + CdA discharge
13.79 cfu/L upstream E. coli
126 max effluent concentration
2.32 cfs effluent flow=14.30cfu in-river concentration of *E. coli* downstream of HARSB

HARSB Proposed
spreadsheet inputs:
509.3cfs upstream flow + CdA discharge
13.79 cfu/L upstream E. coli
126 max effluent concentration
3.7cfs effluent flow= 14.60cfu in-river concentration of *E. coli* downstream of HARSB

Increase of 0.30cfu

Post Falls

current design	new design
3.48mgd (5.38cfs)	5mgd (7.7cfs)

Post Falls Current
spreadsheet inputs:
512 cfs upstream flow + CdA + HARSB current
14.30 cfu/L upstream E. coli
126 max effluent concentration

5.38cfs effluent flow= 15.46cfu in-river concentration of *E. coli* downstream of Post Falls

Post Falls Proposed
spreadsheet inputs:
513 cfs upstream flow + CdA + HARSB proposed
14.60 cfu/L upstream E. coli
126 max effluent concentration
7.7 cfs effluent flow =15.95cfu in-river concentration of *E. coli* downstream of Post Falls

Increase of 0.49cfu

Assimilative Capacity

The assimilative capacity and the amount of that capacity that is determined to be insignificant degradation is calculated as follows:

126 cfu (Standard) – 13.79 cfu E. coli (background + current design of CdA) =
112.21 X %10 (insignificant amount) = 11.22cfu

Therefore, the dischargers collectively, cannot increase *E. coli* concentrations in the river by more than 11.22cfu as a result of increased design flows.

Currently Permitted
11.7cfu above CdA → 13.79cfu below CdA → 14.30cfu below HARSB →
15.46cfu below Post Falls

Proposed Increases
11.7cfu above CdA → 13.79cfu below CdA → 14.60cfu below HARSB →
15.95cfu below Post Falls

Calculation of Significance
HARSB new design flow increased E. coli by 0.3cfu or
0.3cfu ÷ 112.21cfu = 0.27% increase

Post Falls new design flow increased E. coli by 0.49cfu or
0.49cfu ÷ 111.91cfu =0.44% increase

In total, the two dischargers at their new design flows would decrease assimilative capacity by 0.71%. This increase does not exceed 10% of the remaining assimilative capacity and therefore, is not a significant degradation of river water quality.

Appendix B
HARSB Phosphorus Significance Test

Background
The Spokane River is considered a high quality water for recreational uses. To prevent the lowering of water quality with respect to phosphorus, DEQ must ensure that the Hayden Area Regional Sewer Board (HARSB) draft permit must not cumulatively decrease the remaining assimilative capacity of the river by more than ten percent to be considered insignificant degradation (Idaho Code §39-3603(2)(c)(i)).

HARSB is currently discharging to the Spokane River during part of the year and is requesting a year around discharge which includes the previously unpermitted timeframe of June through September when river flows are less than 2,000cfs. This timeframe is the subject of the significance test. The draft permit and draft 401 certification conditions require that discharges of phosphorus for the rest of the year under all flow conditions remain constant or decrease.

To determine if the HARSB new phosphorus discharge is significant to water quality the following values must be determined: 1) the background concentration of phosphorus in the river above the HARSB outfall after considering the currently permitted full design flow of any upstream dischargers; 2) critical river flow; 3) the change in phosphorus concentration of HARSB effluent from current to new design flow.

Table 1: Seasonal Low Flows in the Spokane River

Season	1Q10 (CFS)	7Q10 (CFS)	30Q10 (CFS)
October – May	927	1030	1270
June – September (based on historical data)	251	294	363
June – September (FERC license)	500		

Analysis
The Washington TMDL model used a phosphorus concentration of 6µg/L at the mouth of the Spokane River above any point source discharger outfalls. This river background value will be used in this analysis. The critical flow for the June through September timeframe will be the minimum river flow allowed by the Avista relicensing agreement as shown in Table 1. This formula is used to convert load to concentration:

load in lbs/day ÷ (design flow in mgd X 8.34) = mg/LX1000=µg/L

CdA Current
The following information was used to calculate the currently permitted in-river phosphorus concentration below the CdA outfall:

- The current permit for CdA during the June through September timeframe requires an 85% removal rate or 1mg/L phosphorus whichever is greater.

- The average phosphorus concentration discharged by CdA (DMRs 2006-2011) for the June through September timeframe was 840µg/L however the maximum allowable concentration during this timeframe is 1,000µg/L.
- The critical river flow of 500cfs.
- A 100% mixing zone was allowed.

The resulting concentration of phosphorus in the river below the CdA outfall is 24.15µg/L. This concentration becomes the upstream phosphorus concentration for the next downstream discharger since CdA is not proposing an increase in design flow or an increase in phosphorus load.

CdA Proposed with Final Effluent Limits

The following information was used to calculate the proposed permit in-river phosphorus concentration below the CdA outfall:

- The CdA draft permit requires a new phosphorus effluent limit of 3.17 lbs/day or an effluent concentration of 63.3µg/L for the February-October time period.
- The design flow remains at 6mgd or 9.3cfs.
- A 100% mixing zone was allowed.
- The critical river flow is 500cfs.

The resulting concentration of phosphorus in the river below the CdA outfall will be 7.05µg/L.

CdA Proposed with Interim Effluent Limits

The following information was used to calculate the proposed permit in-river phosphorus concentration below the CdA outfall:

- The CdA draft permit requires a new phosphorus interim effluent limit of 1,000µg/L for the February-October time period.
- The design flow remains at 6mgd or 9.3cfs.
- A 100% mixing zone was allowed.
- The critical river flow is 500cfs.

The resulting concentration of phosphorus in the river below the CdA outfall will be 24.15µg/L.

HARSB Current

The following information was used to calculate the currently permitted in-river phosphorus concentration below the HARSB outfall:

- The current permit for HARSB does not have effluent limitations for phosphorus.
- HARSB currently permitted design flow is 1.5 mgd or 2.32cfs.
- Average phosphorus concentration during the June through September timeframe of 3,650µg/L (2008-2011 DMRs).
- The critical river flow of 500cfs + 9.3cfs CdA discharge=509.3cfs.
- A 100% mixing zone was allowed.

The resulting concentration of phosphorus in the river below the HARSB outfall is 40.59µg/L. During periods of no discharge the concentration remains at 24.15µg/L.

HARSB Proposed with Final Effluent Limits in Effect

The following information was used to calculate the draft permit in-river phosphorus concentration below the HARSB outfall using CdA final effluent limits:

- The HARSB draft permit requires a new phosphorus effluent limit of 1.33 lbs/day or an effluent concentration of 66.5µg/L for the February-October time period.
- The new design flow is 2.4mgd or 3.7cfs.
- A 100% mixing zone was allowed.
- The critical river flow is 500cfs + 9.3cfs CdA discharge=509.3cfs.
- Upstream phosphorus concentration is 7.05µg/L.

The resulting concentration of phosphorus in the river below the HARSB outfall is 7.48µg/L. Therefore, for the June through September season, water quality will be improved from the currently permitted conditions of 24.15µg/L.

HARSB Proposed with Interim Effluent Limits in Effect

The following information was used to calculate the draft permit in-river phosphorus concentration below the HARSB outfall using CdA interim effluent limits:

- The HARSB draft permit requires a new phosphorus effluent limit of 1.33 lbs/day or an effluent concentration of 66.5µg/L for the February-October time period.
- The new design flow is 2.4mgd or 3.7cfs.
- A 100% mixing zone was allowed.
- The critical river flow is 500cfs + 9.3cfs CdA discharge=509.3cfs.
- Upstream phosphorus concentration is 24.15µg/L.

The resulting concentration of phosphorus in the river below the HARSB outfall is 24.46µg/L. Therefore, for the <2,000cfs June through September season, water quality will be lowered by 0.31µg/L.

Assimilative Capacity

Best available information gives a target phosphorus concentration of 16µg/L from May through October (A Phased Approach Total Maximum Daily Load for Total Phosphorus for the Spokane River in Idaho. Cochrane, 1994).

The assimilative capacity and the amount of that capacity that is determined to be insignificant degradation is calculated as follows:

16µg/L (draft TMDL target) – 6µg/L background concentration= 10µg/L
X %10 (insignificant amount) = 1µg/L

Therefore, the dischargers collectively, cannot increase phosphorus concentrations in the river by more than 1µg/L as a result of increased design flows.

Calculation of Significance

HARSB new design flow during interim effluent limits increased phosphorus by 0.31µg/L or

0.31µg/L ÷ 10µg/L X 100 = 3.1% decrease in assimilative capacity

This decrease does not exceed 10% of the remaining assimilative capacity and therefore, is not a significant degradation of river water quality.

There are additional assurances that the provisions of the antidegradation rules will be met for HARSB's new discharge. The CdA draft 401 certification allows for a ten year compliance schedule for the facility to meet the final effluent limits. Prior to this time, CdA will not discharge phosphorus at higher concentrations or loads than currently permitted per their interim effluent limit requirement and condition in the 401 certification. Additionally, HARSB must meet their draft permit effluent limits without the benefit of a compliance schedule for the summertime <2,000cfs time period, therefore ensuring that the phosphorus concentrations used in this analysis will not exceed the draft permit effluent limit of 1.33 lbs/day.

Graphically changes in phosphorus concentration in the Spokane River can be shown as this:

Currently Permitted
6µg/L above CdA → 24.15µg/L below CdA → 24.15 below HARSB (no discharge)
→ 78.84µg/L below Post Falls

Proposed Increased Design Flows with Draft Permit Interim Effluent Limits
6µg/L above CdA → 24.15µg/L below CdA → 24.46µg/L below HARSB
→ 48.39µg/L below Post Falls

Proposed Increased Design Flows with Draft Permit Final Effluent Limits
6µg/L above CdA → 7.05µg/L below CdA → 7.48µg/L below HARSB
→ 8.5µg/L below Post Falls